Summer 2020

PHYS 111-450: Physics I

George Georgiou

Physics 111 Summer 2020 Syllabus

TuWTh 9-12 ONLINE (njit.webex.com)

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Office hours: After class or by appointment (send email)

1. **Co-requisites: Math 111 (some differential calculus) and Phys 111a (Lab required if not passed)**
2. **Textbook***: Sears and Zemansky's University Physics with Modern Physics*, 13th Edition Technology Update, by Young and Freedman. The publisher is PEARSON. (also used for Phys 121 and 234) **An older or newer edition can be used. Any calculus-based textbook is acceptable. You must read a textbook to supplement class.**
3. **Classes:** The NJIT attendance policy is the following: "It is expected that students will attend all lectures and recitations. Webex sends an attendance report If you must withdraw from the course, do it officially through the Registrar, otherwise your course grade will be F.
4. **Homework: (12% of grade)** Half of the exam questions are related to the homework, so the understanding you gain counts twice. Be sure that your text includes a Mastering Physics "student access code card" for the homework at www.masteringphysics.com. Alternatively you can purchase only a homework access code at masteringphysics.com. DO NOT PURCHASE from other sources since these codes may be expired. The homework course ID is **MPGEORGIOU111SUM20a**, which is closely tied to the text. **Doing homework helps on exams and is part of your grade. See instructor or classmate for help.**
5. **Exams**: **(total 88% of grade): 3 exams 1.5 hour exams (18% each,** See below for dates)
   Final 2.5 hours (34%)
   The exam questions are multiple-choice with content See the schedule below for details. The Final will emphasize the weeks of work after Exam 3, but cover the whole course.

   Exams will be emailed to students signed into webex with video on, on the exam date. An honor system will be used. I will assume that you will not use your notes or textbook. I will also use past experience to compare this class average with other past class averages
6. **Letter grades:** The conversion of numerical to letter grades is as follows:

   > 90% A; 80 – 89% B+; 70-79% B; 65-69% C+; <55-64% C; 50-55% D; < 50 F.

   If you have a question about any grade, you must ask your professor before the final exam. After the Final exam, grades are not open to discussion: A score of 90.0% is a B+, not an A.

HONOR CODE: "NJIT has a zero-tolarance policy for cheating of any kind and for student behavior that disrupts learning by others."

Detailed Schedule

Class Weeks, topics and dates	Book Chapters	Lab numbers and Topics
5/19 1D motion and units	Ch.1.1-6 and 2	Introduction
5/20 2D motion , vectors	Ch. 1.7-9 and 3.1-3	109. 1 D motion
5/21 Linear static forces , Equilibrium, Inclines Coupled Objects	**Days 5/21-5/22** Ch. 5.1-5.3	111. Projectile motion
5/26 Linear Static Forces and Friction **EXAM 1** **1D&2D motion, units,vectors**	Ch. 5.1-3	112 Newton's 2nd
5/27 Work and kinetic energy	**Ch. 1.10 and 6**	103 Linear static equilibrium
5/28 Potential Energy Springs, Conservation of energy	**Ch. 7**	106 Friction
6/2 Potential & conservation of Energy **6/2 Exam 2** **Forces including friction, work**	Ch. 7 **Days 5/21-5/27**	6 Work and Kinetic Energy
6/3 Momentum and Collisions	Ch. 8	125 Conservation of Energy
6/4 Circular motion	Ch. 3.4 and 5.4	126 Conservation of momentum
6/9 Torque, Moment of Inertia	Ch. 1.10 and 9	114 Circular motion
6/10 Rotational Motion	Ch. 10.1-6	9a1: Moment of Inertia & Rotational Energy
6/11 Rotation statics	Ch. 11.1-3	127 Torque and inertia
6/16 Exam 3 **Momentum, circular motion, torque** 6/16 Gravitation	**Days 6/3-6/13** **Ch.13**	121 rotation static forces
6/17 Fluid Mechanics	Ch. 12.1-5,	7 Archimedes' Principle
6/18 FINAL EXAM	**Mostly after Exam 3, but all topics**	

The syllabus dates are flexible. More or less time will be spent on a topic based on the class understanding.

Labs are on the same topics as lectures, homework and practice problems, but a week later so the class work will introduce the labs.

Recommended practice problems in the text; These are good practice.
pg. 28 - 14, 9, 10
pg. 60 – 4, 7, 15, 20, 25, 38, 44, 80
pg. 96 – 4, 7, 12, 19, 24, 26, 35, 47, 56, 57
pg. 128 – 4, 10, 17, 21, 28, 32, 43, 46

pg. 163 – 2, 4, 10, 13, 17, 28, 42, 46, 54, 68
pg. 198 - 7, 15, 21, 37, 46, 50, 56, 75, 86
pg. 232 – 2, 5, 9, 15, 23, 30, 37, 38, 42, 45, 55
pg. 268 - 6, 8, 19, 21, 25, 41, 43, 48, 55, 62

pg. 299 - 3, 11, 18, 25, 30, 40, 49, 54, 60, 87
pg. 334 – 1, 8, 9, 17, 26, 33, 36, 42, 49, 67, 70
pg. 361 – 2, 5, 14, 19, 20, 46, 49, 60
pg. 394 – 3, 8, 10, 21, 26, 31, 37, 44, 59, 91, 94

pg. 429 – 5, 6, 13, 15, 18, 22, 24, 32, 37

Learning outcomes:

1. Units, estimates and significant figures in the evalutaions of events or objects of realistic significance.
2. Magnitude and direction of vector combinations using addition, subtraction, scalar, and cross product.
3. Position, velocity and acceleration of an object moving in a straight line under constant acceleration and under realistic circumstances and also for motion in a plane using orthogonality.
4. Net force, mass and acceleration (Newton's Laws) as the basis of motion.
5. The same quantities using geometery, free body diagrams and frictional forces.
6. Acceleration and force of circular motion at constant speed.
7. The same quantities taking into account conservation and non-conservation of energy for linear and rotational motion.
8. The momentum and impulse under realistic circumstances and events.
9. Work, energy, and conservation of energy of mechanical and non-conservative systems for linear and rotational motion.
10. Center of mass of a system as well as its moment of inertia in the context of static and dynamic conditions.
11. Parameters of static and linear motion of fluids using pressure, conservation of energy and mass.
12. Mass and distance in the force and potential energy involved in the gravitational field.